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THE NUTRITION OF DAIRY COWS*

BY

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The largest problem confronting the dairy farmer is that of feeding his herd of milking cows, for economic rations that are ample in required nutrients are essential for success. He has to provide for animals that have been changed by selective breeding. A cow that is not domesticated gives about 100 to 150 gallons of milk in a lactation, but now many give 10 times this yield, and some 20 or even 30 times. To enable these levels of production to be achieved the rate of functioning of the excretory, digestive and circulatory organs has been accelerated greatly, and their demands for nutriment increased. In addition, milking cows are now more closely confined for, instead of sheltering under trees and browsing at will, they are tied all day during winter in stalls.

When attempting to consider the feeding of dairy cows in a general way, the different systems of husbandry employed complicate the subject. Cheap feeding is the only consideration on some farms, and the result is a low standard of production. At the other extreme very intensive methods of feeding and management are practised by pedigree breeders on farms where the production of high yielding dairy stock is the main objective. High yields are required to demonstrate the productive capacity of the herd, and must be obtained regardless of cost, for the financial returns come from selling highly priced stock. On most commercial farms the standard of feeding falls between these two extremes and the criterion of efficiency so far as these farmers are concerned is the profit and loss account. But uneconomic production is certainly not the only result of bad feeding, for some dietetic errors cause obvious symptoms of disease, and in addition to these recognisable losses, disease resulting from a nutritional deficiency may be complicated by the presence of parasitic and infectious agents : cows suffering from a lack of one or several essential nutrients may lose their ability to withstand infection and will be overcome by the combined effects of malnutrition and disease. It must be realised, however, that dietetic diseases may not appear until after a deficient ration has been fed for several months or years. The aim of good feeding should be to keep cattle in good health and near a maximum fertility and milk yield through an unlimited number of generations, and it must be remembered that to-day a dairy heifer is bred before she has attained full growth, and that from the moment of her first conception to the end of her useful life should always be pregnant or lactating, or both.

The types of food required are best considered under the following headings—concentrates, roughages, and succulent foods, for in numerous experiments with cattle the nutritive properties of each group have been studied and assessed. The *concentrate foods* comprise grains, such as legumes and cereals, the oil cakes, and certain special foods such as mineral mixtures. In using concentrates the peculiarities of ruminant digestion have to be considered, for mastication is incomplete and if whole grains such as oats are fed they pass almost completely unchanged into the rumen, and as the bolus which is later regurgitated and returned to the mouth by chewing contains principally roughage, the whole grains escape remastication and pass with little change completely through the alimentary tract. For this reason any grains fed must be crushed or preferably ground.

At the present time because of the high cost of concentrate foods farmers are tending to restrict their use, but some pedigree breeders aiming at very high milk yields feed to selected individuals a high concentrate ration which does not include sufficient bulk to ensure proper rumination. In some of these animals a ruminal impaction occurs which is difficult to relieve. To obtain the maximum yield possible some cows are " steamed-up " by being given a concentrate ration of 6 lb. per head per day six weeks before they are due to calve, rising to 12 or even 20 lb. the week before parturition is due. It has been found that this " steaming-up " increases the daily milk yield, lengthens the lactations of cows which tend to milk for a relatively short period only, and slightly increases the butter-fat percentage. In an Ayrshire herd of 40 milking cows in Cheshire the introduction of " steaming-up " appeared to increase the incidence of milk fever. Before its use milk fever was rarely observed, but in the 12 months following its introduction seven cases were seen, of which three developed before parturition, an occurrence which had not been encountered before. The " steaming-up " was then modified so that the cows were allowed up to 8 lb. of concentrates per head per day only, and in the following 12 months only three cases of milk fever were treated.

" Steaming-up " rations going to 12 or 20 lb. per day may induce milk formation before calving and the cows' udders become distended, tense and painful. These cows are often milked before they calve to avoid damage to the udder tissue and to prevent the milk being re-absorbed with a consequent reduction in the yield after calving. The cows have to be milked for from 3 to 11 days before calving, and the total amounts of pre-parturient milk withdrawn vary from 2 to 60 lb. It has been suggested that pre-milking increases the risk of milk fever, but this is not supported by records obtained from five herds (Hill, Widdowson & Maggs, 1950). In 86 calvings, when pre-milking had been practised there were only three cases of milk fever—one each of Friesian, Jersey and Guernsey. The last-mentioned animal was known to have suffered from milk fever twice before and on neither of these occasions had it been pre-milked. It has been suggested, further, that pre-milking has a tendency to prevent milk fever by bringing the cows into milk gradually. A total of 47 cows, 27 Holsteins and 20 Jerseys, were divided into four groups : two groups of Holsteins (one pre-partum milked and the other one a check group) and two groups of Jerseys, one pre-partum milked and the other one a check group (Smith & Keyes, 1951). There were no milk fever cases occurring in any of the Holstein cows. Seven milk fever cases occurred in the Jersey cows, and a total of 23 per cent. of the pre-partum milked Jersey cows had milk fever compared with 43 per cent. of the check Jersey cows. In all the cases of milk fever that occurred in the pre-partum

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milked Jerseys, the cows did not come to their expected flow of milk before parturition.

In cows from which only a small quantity of pre-parturient milk is withdrawn the colostrum produced after calving is very similar to that from cows which have not been pre-milked, but in those from which larger quantities are taken the secretion approximates normal milk. It seems definite that the composition of the secretion at parturition is related to the total amount of colostrum produced before parturition. If the calves are from cows which have had over 20 or 30 lb. of milk drawn from them they receive no colostrum, and because they have no protection from antibodies they are more susceptible to white scour ; moreover, as they do not have the globulin of colostrum which can be absorbed through the alimentary canal, but have to digest milk, they tend to suffer from digestive disturbances.

Under the general heading of concentrate foods can be included special foods such as mineral mixtures. Calcium and phosphorus, which together form over 90 per cent. of the ash of the body, are of the greatest importance. The production of large quantities of milk means that these elements are removed from the bones, and at the start of a lactation the skeleton is continually being deprived. In the good dairy cow this is a physiological state but if it proceeds beyond the normal, demineralisation of the bone may occur. Of the 1¼ to 1½ oz. of minerals contained in a gallon of milk calcium represents ¼ oz., and, although the hay supplies some of the total required, it is generally necessary to supplement it. Phosphorus occupies about ¼ oz., and although some of this is contained in the seed components of the ration, heavy producers need extra. Of the other minerals, potash also represents ¼ oz., but the grass and herbage provide more than enough. Chloride comprises ½ oz. and may need supplementing, while about ¼ oz. of sodium is lost. Although this element is contained in grass and concentrates extra may be needed. Legumes and cereals nearly always contain the iron and sulphur required. Steamed or sterilised bone flour forms the basis of most mineral mixtures and is generally ground and then steam sterilised. The ratio of calcium and phosphorus should be approximately 1 : 1. Such are quite safe for feeding, but imported bone meals, generally intended for use as manures, have been blamed for spreading anthrax. In the past mineral mixtures have been prepared from rock phosphate containing fluorine and poisoning has resulted.

A noteworthy peculiarity of digestion in ruminants is their ability to break down the cellulose and other complex polysaccharides of fibre. When this coarse fibrous material is broken down nutrients held within the cell walls of the plants are released. In addition, by conversion into bacteria and protozoa useful protein may be synthesised from non-protein sources such as urea and ammonium salts. Thus ruminants can use large volumes of foods too coarse and bulky for other types of livestock and obtain from them some 30 per cent. of the energy they contain. The three most important *roughages* are hay, silage and dried grass, for straw, even oat straw, is too indigestible for lactating cows. One of the great difficulties in speaking of the use of these roughages is that their feeding value varies enormously. Hay can vary from a nutritious food with a high digestible value, rich in protein and minerals, to a mass of bulky fibrous indigestible stalks, and yet some farmers refer to both as hay and tend to consider them as of equal value. Similarly they regard as of equally high quality silage made from young growing grass and the musty material which comes from a silo when a coarse weedy cut of flowering grasses has been ensiled. Good hay forms the basis of most winter rations, and cattle will remain alive and in good health for many years on hay alone, but high-producing cows cannot be kept anywhere near their maximum milk production on a diet of roughage, because they are not able to eat and digest the enormous bulk of this kind of food which would be necessary to supply the nutritive energy required for milk production. Some cows endeavour to obtain the nutrients they require by consuming too heavy a diet of hay, and when lying and chewing the cud they grunt each time a bolus ascends. Occasionally bovines will fill the rumen with fibrous chaff to such an extent that the condition can be relieved only by a rumenotomy operation. This occurs particularly at threshing time. At the start of threshing there is room for the storage of the grain, the chaff and the straw, but as the operation proceeds storage space becomes short ; the chaff is then tipped into a loose-box containing a bull or young cattle and these animals are attracted by the fresh chaff and overeat.

In the early years of the war silage was widely used but then its popularity waned somewhat. The reasons were that the farmers wanted their early grass and their aftermaths for grazing, and desired to grow cash crops on their arable land. In addition, they found they could get a greater bulk of food by cutting their grass for hay. However, there is now another swing and silage, particularly pit silage, is again popular. Most farmers aim to produce an acid light brown silage with a pleasant acid smell largely due to the presence of acetic acid. It is readily eaten and stock thrive on it. Sometimes sour silage is produced if an immature succulent crop with a high water content is packed down tightly so that the air is excluded to such an extent that little heating is possible. It has a pungent and very unpleasant smell due to the presence of butyric acid. The smell can be detected 100 yards away from the silo, and clings for 36 hours to the hands of any who touch it. No sensible farmer would feed it to lactating cows but most have to use it on the young stock as they have no other food available. The cattle do not like it but consume it rather than go hungry, and it does not appear to harm them.

Frequently a ration of roughages and concentrates only is fed to cows during the winter months and, experimentally, it has been fed to cows which have lived on it for nearly nine years (Meigs, 1939). However, the heifers from these cows subjected to the same procedure were found difficult to get in calf. They came in heat regularly but failed to become pregnant even though mated many times. Heifers from cows that had the same rations but with even small amounts of pasture occasionally in the summer, were not difficult to get in calf, and the failure to conceive in the heifers from the cows that had had no pasture tended to be corrected if the heifers themselves were given pasture for fairly long periods. Living foods, preferably pasture, should therefore be made a part of the annual dairy ration. There is every reason to think that good pasture is rich not only in carotene (provitamin A) but also in other organic nutritive essentials, and that turning cows out on pasture for a part of the year provides insurance against a number of deficiencies that cannot be avoided by any kind of concentrate ration known at present.

The most important *succulent food* is grass, and pastures have a feeding value which varies with the stage of development of the individual plants. Great attention has been paid recently to the re-seeding of pastures and to intensive methods of grazing which increase their productivity, and much has been said of the increase in the incidence of such diseases as parasitic bronchitis and gastritis, Johne's disease, acetonaemia and hypomagnesaemia which have resulted from these changes. The scouring which occurs when stock which have been housed during winter are turned out to grass in the spring is likely to be more acute on lush leys, particularly if they are rich in clovers, than on old permanent pastures. Most farmers correct this by feeding hay before turning out, or

giving undecorticated cotton cake, a very constipating food, to counteract the laxative effect of the grass. The butter-fat content of the milk is lowered markedly if a ration low in fibre is fed, and this may be seen when cows are turned out to grass in the spring. During the winter months most cows receive a high roughage ration, and if they are turned on to lush spring grass there is a depression in fat percentage which may be as high as 1 per cent. In some cases the trouble is aggravated by an excess of protein, which also depresses butter-fat percentage. Occasionally the reverse is seen when animals go from a low roughage and high concentrate winter ration to a mature spring grass. On older permanent pastures where weeds have become established poisonous plants grow, but it is rarely that confirmed cases of poisoning are encountered. It appears that if cattle have grass before them they will avoid poisonous weeds, but that if they have to choose between eating a poisonous plant and going hungry they may choose to eat the plant. Many different kinds of weeds, especially if eaten shortly before milking, are likely to affect the flavour of the milk. Some of the volatile acids are destroyed in the blood, and a larger percentage passes off in the breath. Most of the essential oils are eliminated in the urine, and as these undesirable products are destroyed, or eliminated from the blood, their concentration in the milk decreases because of their diffusion back into the blood. Some of the commonest weeds which impart an undesirable flavour to milk are the wild onions and garlics, horsetail, yarrow and St. John's wort (Long, 1938).

The incidence of the acute type of bloat, in which a number of cattle in a herd grazing on a particular crop are affected to a varying degree within an hour or less, has increased markedly since so much land has been sown down to new leys. The majority of cases occur on young actively growing pastures with a high clover content, but occasionally permanent pastures rich in clover are involved. In some cases the gas is above the main mass of foodstuffs and readily will escape through an inserted cannula. In other cases the gases are thoroughly mixed up with the ingesta, giving rise to the so-called "frothy" type of bloat, and puncture of the rumen with a trochar and cannula provides no relief, as the instrument is quickly blocked by the solids. The consumption of succulent foods, particularly wild white clover, which ferment rapidly and produce excessive amounts of gas, is necessary but there are various theories about other factors which are involved. It has been suggested that a poison such as prussic acid is produced which interferes with the act of belching, and that a saponin is found which induces a frothiness which prevents the gas escaping from the ingesta and being discharged by belching. It appears that the absence of sufficient roughage to stimulate the ruminal muscles and initiate belching is important, and many farmers feed hay or straw before turning out on new pastures, while others include coarse grasses, such as tall fescue, in the seed mixture, for the texture of their leaves appears to stimulate peristaltic action.

On many dairy farms to-day farmers are buying less concentrate food and wondering if they can feed their milking cows entirely on grass and its products. It is possible, but the consistent production of good quality grass products needs skill and good fortune, and there is so little variety in the diet that the appetite is probably less than it would be with a variety of foods. However, a ration of 12 lb. of baled dried grass, 3 lb. of hay, 20 lb. of grass silage and 10 lb. of dried grass meal will provide for maintenance and the production of 4 gallons of milk, but if this ration were adopted a lactation average of about 700 gallons would probably be the maximum (Holmes, 1951).

The root crops have a high moisture and low fibre content. They are succulent, laxative and palatable and are beneficial to digestion, especially in animals receiving a heavy concentrate ration. To-day kale is the most popular root crop for cattle feeding, but in some areas rape is becoming increasingly used as it can be grazed in the autumn and winter. The incidence of rape poisoning appears to be on the increase, and, though the symptoms vary, the following have been encountered—acute pulmonary emphysema and oedema, haemoglobinuria, nervous symptoms, blindness and bloat. It is very difficult to determine why these conditions develop. It has been suggested that frosting plays a part, and that the purpling of the plant is necessary, but neither factor appears to be constant. Root crops will occasionally cause trouble by tainting milk. Turnips do so at times, and the odour is taken up by the blood and excreted in the milk. However, it is more common to find that the turnip taint has been absorbed by the milk because it has stood in the food store in which the turnips are kept. Some farmers feed raw potatoes, because their feeding value is higher than the other roots. They always induce salivation and the stringy tenacious ropy saliva fouls the troughs. If fed whole there is always a risk that a round or oval tuber will be swallowed whole which will be too large to pass through the cardia into the rumen. If this occurs towards the end of a meal, the tubers eaten earlier ferment and cause bloat.

In general in this country foods from these groups are combined to form the rations fed to cows, and it is important that farmers should realise that the only portion of the diet that is of value to the cow is that portion which diffuses through the wall of the gut into the blood stream. The analyses of feeding-stuffs commonly obtained for concentrate foods and samples of silage and dried grass show the total amounts of protein, fat, carbohydrate and fibre contained and do not indicate the quantities that are digestible and therefore of value. Digestibility can be determined only by animal experiment, and this is too complicated a test for routine use. In addition, in practice it is found that the rate at which foods pass through the cow influences the efficiency of digestion (Balch, 1950). The relationship between the rate of passage and the digestibility of the diet is particularly important in cattle, for the variations in the consistency of the faeces produced at different seasons and from different diets, which is more marked in cows than in most animals, suggest that the rate of passage of foods must vary considerably. In general, the passage of foods tends to be rapid when the diet includes a high proportion of water, and the breakdown of crude fibre in the reticulo-rumen is faster when the ruminal contents are more fluid. Ground hay is invariably excreted more rapidly than unground hay, and it is suggested that the increases in the dry-matter content of the reticulo-ruminal digesta which normally accompany its ingestion are mainly responsible for the lower digestibility of ground hay as compared with that of unground hay. The rate of breakdown of cellulose is also closely related to the dry-matter content of the surrounding digesta, for a low dry-matter content favours its rapid breakdown (Balch & Johnson, 1950).

In planning the ration the total dry-matter content must be considered, for the total appetite of cows varies from about 20 lb. dry matter per day for Jersey cattle to about 26½ lb. for Friesians, and food offered greatly in excess of these figures is left untouched. Linked with this is the question of palatability, for unpleasant foods hinder digestion, and, unless the food is appetising, heavy milking cows may not eat the quantities considered desirable. Such concentrate foods as coconut and palm kernel cakes are dry to the taste and unpalatable and must be mixed with agreeable foods until the cattle become accustomed to them. Hay which has become mouldy may be mixed with salt or sprinkled with

treacle water to tempt the cows to eat it, but it must be remembered that such treatment only improves its palatability, not its feeding value.

For accurate rationing it is necessary to record the milk. The usual custom is to take the average yield per day for one week for each cow and calculate the next week's requirements accordingly. Rations are generally estimated as the requirements, firstly for maintenance and secondly for production. The maintenance section is the food needed to maintain a resting animal in health without losing or gaining in weight. It must supply enough starch equivalent to maintain the body at 37° C. and perform the work of standing and lying, and the protein equivalent needed to renew the body tissues. The production part of the ration is needed above this to provide for milk secretion. However, in practice it is not always possible to divide the feeding accurately into these divisions and the cows may need to be fed more than they require in the less active portions of their reproductive cycle, in order to make up for unavoidable losses in the more active portions.

The maintenance ration is nearly always composed of home-grown foods (Hunter-Smith & Gardner, 1950). During winter 20 lb. of good hay is often used, or 14 lb. of hay and 40 lb. of roots, or 14 lb. of hay and 14 lb. of potatoes, or 60 lb. of silage. To-day many farmers use home-grown foods for maintenance and the production of 1 gallon of milk, feeding good hay 27 lb., or such mixtures as hay 20 lb. and kale 28 lb., or hay 20 lb. and dried grass 5 lb., or hay 20 lb. and wet brewers' grains 14 lb. Maintenance plus 2 gallons can be achieved by adding 14 lb. of grass silage or 28 lb. of kale or 5 lb. of dried grass to the rations just given. Maintenance plus 3 gallons can be obtained by adding another 14 lb. of grass silage or 5 lb. of dried grass. During the best of the flush grass period a good pasture can be used to supply all the requirements for maintenance and the production of 3 gallons of milk, but it does need a really good pasture to achieve this and most will only do maintenance and 2 gallons. Cows yielding more milk than is provided for in these rations must have a concentrate supplement. This is prepared so that 3 to 4 lb. are given per gallon for the heavy breeds and from 3½ to 4½ lb. per gallon for the Channel Island breeds to provide for the high fat content of their milk. When the ration has been prepared it is usual to provide the cowman with a scoop which will hold the amount of the mixture required per gallon, but some farmers weigh the food for each cow on a spring balance before feeding. In this country it is usual to vary the concentrate ration week by week according to the yield of the cow, but in the United States of America it has been suggested that better results are obtained by estimating the quantity of concentrates required by a cow in a lactation and feeding a constant quantity each day. When preparing a concentrate ration it will be found that some foods are balanced for milk production and can be given in any amounts, brewers' grains, bran, weatings, and dried grass being examples. Such foods as cottonseed cake, soya bean cake, and ground nut cake are high protein foods and need to be balanced with very starchy foods such as flaked maize, barley or dried sugar beet pulp. Medium protein foods, such as malt culms, linseed cake and beans, have to be mixed with starchy foods such as oats or rye. By balancing each food in this way a ration containing a number of foods can be prepared so that it is correctly adjusted for milk production. However, it must be remembered that the final opinion about the efficiency of a ration can be given only by the cowman tending the cows. A good cowman is still as important as ever, for cows are individual animals, not machines in a factory. As an American, T. L. Haeker, has said, " a gentle voice and a caressing touch are quite as potent as digestible protein " (Mackintosh, 1938).

EXCHANGE TRANSFUSION IN THE FOAL

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Introduction

A technique for the operation of exchange transfusion in newly born foals was described by Farrelly, Belonje & Cronin (1950). The technique now to be described was developed as a result of experience in the use of the earlier technique and it is believed to offer a number of advantages over the older method.

The operation is used in foals exclusively for the treatment of haemolytic disease resulting from the iso-immunisation of mares during hetero-specific pregnancies.

Apparatus Required

The special apparatus required in addition to ordinary surgical equipment is as follows :—

1. A supply of sterile blood transfusion bottles each containing 120 ml. dextrose-citrate anti-coagulant solution and 420 ml. of compatible donor blood.

2. A rubber bung to fit (1) carrying long and short glass tubing. The short tubing is provided with a gauze cap and 5 to 6 feet of rubber tubing carrying a spring clamp and terminating in a male " Luer-Lok " or " Record " mount.

3. A special four-way tap shown in Fig. 1. The tap consists of two main parts, an outer fixed ring, and an inner movable core. The outer ring is provided with four ports fitted as follows :—

(*a*) A female " Luer-Lok " or " Record " mount for the attachment of the donor blood delivery tube.

(*b*) A male " Luer-Lok " or " Record " mount for the attachment of the polythene catheter adaptor.

(*c*) A plain outlet, approximately 7 mm. in outer diameter, to which a piece of rubber tubing is attached to conduct the exsanguinated blood to waste.

(*d*) A female " Luer-Lok " or " Record " mount for the attachment of a 20 ml. syringe of the glass plunger type.

The inner movable core is bored so as to permit the connection of ports (*a*), (*b*) and (*c*) successively with port (*d*). The upper end of the inner core is expanded so that its

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perimeter extends over the outer ring. This perimeter is knurled. The lower end of the core is threaded and a washer and hand nut are screwed on it to keep the core and outer ring together. The washer incorporates stops to ensure accurate alignment of both parts of the tap in each of the three positions used during a transfusion. The tap can be dismantled and is readily cleaned and sterilised.

4. A polythene catheter, 18 inches in length, with a bore of 1·5 mm. and a wall thickness of 0·5 mm. Six small side perforations are distributed over a 1-inch length of the catheter at one end. (Suitable openings may be made with a 19 B.W.G. gauge hypodermic needle which has had the point removed and the resulting square-cut end slightly sharpened.)

5. A special adaptor to connect the catheter to the tap. This adaptor consists of two parts which screw together. One part incorporates a rubber gland which fits over the end of the polythene tubing. This gland is tightened when the adaptor is screwed up, thus making a satisfactory union without reducing the bore of the tubing.

6. A McClunn's needle—trocar and cannula type—through which the polythene catheter will pass. This needle is 50 mm. in length and has an outer diameter of 4 mm.

The apparatus should be set up as shown in Fig. 2. The donor blood bottle may be held in a retort stand placed on a convenient shelf or it may be suspended from a roof truss. Either of these arrangements keeps it entirely safe during any struggle the patient may make during the operation. Alternatively, the donor bottle may be held in a retort stand on the operating table. Bottles of blood not actually in use should be held in a bucket of water at a temperature of 37° C. It is convenient to have at least two sets of glass and rubber tubing blood delivery outfits so that the changeover from an empty to a full bottle may be facilitated by having a full bottle of blood ready for rapid connection to the special tap.

Fig. 1

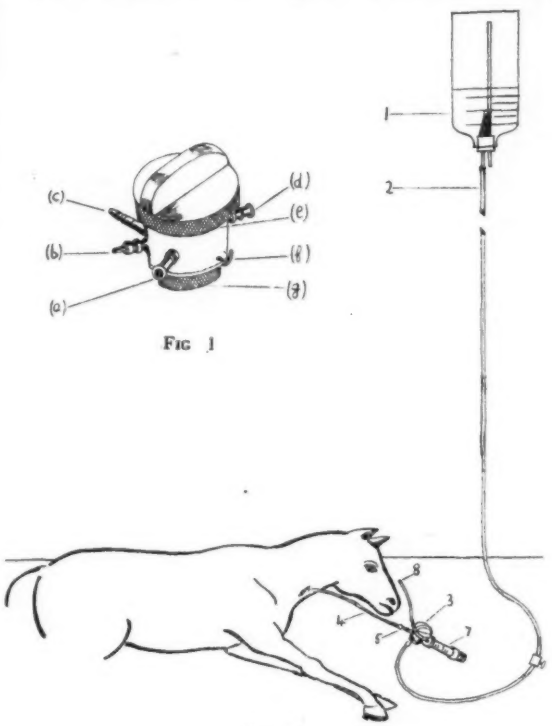

Fig. 2

Fig. 1.—The special tap.

(*a*) A female "Luer-Lok" or "Record" mount for the attachment of the donor blood delivery tube. (*b*) A male "Luer-Lok" or "Record" mount for the attachment of the polythene catheter adaptor. (*c*) A plain outlet, approximately 7 mm. in outer diameter, to which a piece of rubber tubing is attached to conduct the exsanguinated blood to waste. (*d*) A female "Luer-Lok" or "Record" mount for the attachment of a 20 ml. syringe of the glass plunger type. (*e*) Expanded knurled perimeter of inner core. (*f*) Stop to ensure accurate alignment of the two portions of the tap in each of the three working positions. (*g*) Hand nut holding core and outer ring together.

N.B. "Record" type mounts are shown in the sketch.

Fig. 2.—A diagrammatic representation of the apparatus set up for use.

1. Donor blood. 2. Tubing delivery set including two-holed rubber bung carrying long and short glass tubing, gauze filter, rubber delivery tubing and spring clamp. 3. Special tap. 4. Polythene tubing catheter. 5. Polythene tubing adaptor. 7. 20 ml. syringe. 8. Outlet for waste blood.

Procedure

The foal is placed on its left side on a table which should be covered with a firm mattress enclosed in a waterproof cover. Restraint of the foal is best effected by at least three assistants, two to secure the fore and hind limbs and one to immobilise the head and neck. Where assistance is limited, soft webbing hobbles may be used to secure the limbs to the legs of the operating table, but this method of control is not as satisfactory as manual restraint. In cold weather, the foal may be covered by a rug or woollen blanket to conserve body heat.

An area of skin approximately 3 inches square is prepared by shaving, disinfecting, etc., on the right side of the neck immediately overlying the *Vena jugularis* at a point approximately 5 inches from the angle of the jaw, with the head moderately extended. Local anaesthesia is effected along the *Vena jugularis* beneath the prepared skin area. A sterile "windowed" operation cloth is placed over the site and secured by towel clamps. An incision through the skin 1 inch in length is made immediately over and parallel to the jugular vein. The underlying fascia and thin layer of cutaneous muscle are incised to the extent of the skin incision. The vein is then exposed by blunt dissection. It is advantageous to have an assistant help in bringing the vein into prominence by applying digital pressure over the jugular vein on the cardiac side of the incision. Interference with the perivascular connective tissue should be as limited as possible and it is not necessary to mobilise the vein completely, provided that its outer surface is adequately exposed in the opening of the wound. Any bleeding points are controlled by haemostats. With the vein made prominent by an assistant, its wall is grasped with a rat-toothed forceps and the McClunn's needle is passed into its lumen in the cardiac direction. The trocar is removed from the needle and on blood emerging from the cannula, the pressure on the vein is reduced by the assistant until only a slight flow of blood emerges. The plastic catheter is then inserted through the cannula for a distance of about 8 to 10 inches. The cannula is then withdrawn from the vein and removed over the catheter which is left in position in the vein. The catheter is connected to the tap by means of the special adaptor and all pressure is removed from the vein. Haemorrhage is controlled by approximating the lips of the incision with clamps. The clamps also serve to hold the catheter in position by maintaining the skin edges in close apposition around the catheter. If the patient is not *in extremis*, sutures may be inserted at this stage. Otherwise the transfusion must be proceeded with at once.

By means of the four-way tap, donor blood is taken into

the syringe and then by turning the tap, this blood is injected into the foal. Exsanguination is performed by withdrawing the blood from the foal in the same way with the syringe and ejecting it to waste by another turn of the tap. The cycle is repeated by returning the tap to the starting position. This cycle of operations is repeated until the transfusion is completed. Changeover from an empty to a full bottle of blood is effected by turning the tap to the "eject to waste" position and attaching a new delivery set from the new bottle. When only one tubing set is available, the rubber tubing is clamped and the bung carrying the glass tubing is introduced into a full bottle of blood which is then set up as before. Should any air bubbles reach the syringe, they may be removed easily by manipulating the tap and syringe so that all the bubbles collect at the syringe nozzle. They may then be ejected to waste with some blood to ensure their complete elimination from the system.

In foals which are very acutely affected and in which the haemoglobin content of the blood is very low, it is often advisable to give an initial simple transfusion of 500 ml. donor's blood or donor's packed red cells immediately prior to commencing the exchange transfusion. This simple transfusion may be effected through the same apparatus simply by omitting the withdrawal of blood from the foal and its ejection to waste. After each injection the tap is returned to the "donor blood bottle" position and the syringe refilled. This is the most suitable method for transfusing packed red cells. Alternatively, and particularly when whole donor blood is being transfused in, the male mount at the end of the donor bottle tubing may be connected directly to the female mount of the polythene tubing adaptor and the blood may be transfused in by gravity. A simple transfusion of donor blood or of packed red cells also may be given immediately following the completion of the exchange transfusion.

When the transfusion is complete the catheter is withdrawn from the vein and the skin is sutured if this has not been done already. Otherwise, a final suture is made, if the major part of the incision has already been closed. The wound is treated in the ordinary way as for any surgical incision. The usual post-operative precautions are taken to prevent infection with streptococci, *Shigella viscosum* or *Clostridium tetani*.

Discussion

The present communication does not purport to deal with the treatment of haemolytic disease of foals, as this will be dealt with in another paper. The purpose of the present report is to describe and discuss only the technique of exsanguination transfusion, a procedure used as part of the therapy of acute haemolytic disease. In the technique described, there are certain points to which attention must be drawn.

The technique originally described by Farrelly *et al.* (1950) proved simple and safe for use in general practice but it had certain disadvantages, notably, that at least two veterinarians were required to conduct the operation, which usually took about four hours to complete in the case of a full exsanguination transfusion, and the rate of blood flow was not under adequate control as it depended on gravity and on the position of the catheter in the vein. Furthermore, the use of two catheters necessitated two venipunctures and the small size of the catheters greatly retarded blood flow, particularly as satisfactory adaptors were not used with them.

In the technique now described, the discrete, as opposed to the continuous, type of transfusion is carried out. Blood is introduced into the vein and withdrawn from it by the same syringe and through the same catheter. Although both operations are not proceeding concurrently, the exchange transfusion is completed in much less time since no delays due to failures of blood flow occur. The special type of tap has been devised so that it can be held and operated entirely by the left hand while the syringe plunger is operated by the right hand. This one hand operation of the tap is aided by the knurled outer perimeter of the moving portion of the tap, which affords a comfortable grip for the thumb and forefinger, while the body of the tap and the syringe barrel are held in the palm of the hand. This arrangement is shown in Fig. 8. With the foal restrained on a table, the surgeon

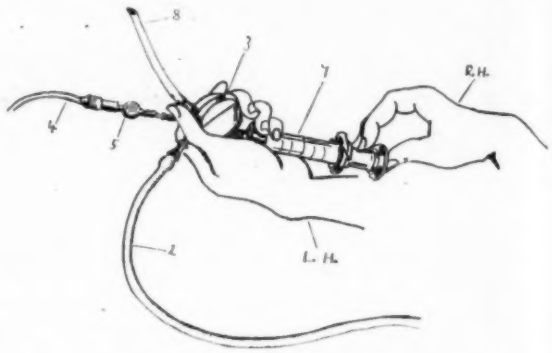

Fig. 3.—Showing the method of operating the apparatus.
L.H. Operator's left hand. R.H. Operator's right hand. 2. Delivery tubing from donor blood bottle. 3. Special tap. 4. Polythene tubing catheter. 5. Polythene tubing adaptor. 7. 20 ml. glass plunger syringe. 8. Outlet for waste blood.

can carry out the transfusion comfortably while seated. A 20 ml. syringe is used and this has proved a convenient size in that no clotting occurs as the syringe is frequently in contact with citrated donor blood. During the course of a full transfusion the plunger of the syringe may tend to stick. It is then rinsed with sterile saline and another syringe is used meantime. It is wise to have three syringes at hand so that no delay occurs while a syringe is being rinsed by an assistant.

It has been found that the polythene tubing may be introduced into the vein more quickly and more easily when a small skin incision is made as described, rather than when venipuncture through the intact skin with McClunn's needle is attempted. The use of a catheter having a fenestrated end renders it impossible for the wall of the vein or one of its valves to collapse on the catheter during the withdrawal of blood, as can occur when a catheter open only at the end is used. A wide bore exit from the tap is provided for the waste blood to facilitate rapid emptying of the withdrawn blood from the syringe. The amount of "dead space" in the system is minimal, as the syringe and the polythene tubing is kept as short as is consistent with safety and convenience in operating.

A considerable advantage offered by this technique is that large volumes of blood may be exchanged with ease, thus affording a much greater chance of recovery in seriously affected foals. A transfusion involving the exchange of 5 litres of blood takes about two and one-quarter hours and this rate of operation involves no cardiac embarrassment, as the small volume of blood (20 ml.) transfused in and withdrawn at each excursion of the syringe plunger is insufficient to affect seriously venous blood pressure or cardiac action. Confining the entrance and exit of blood to one site and controlling both the transfusing in and the bleeding out by

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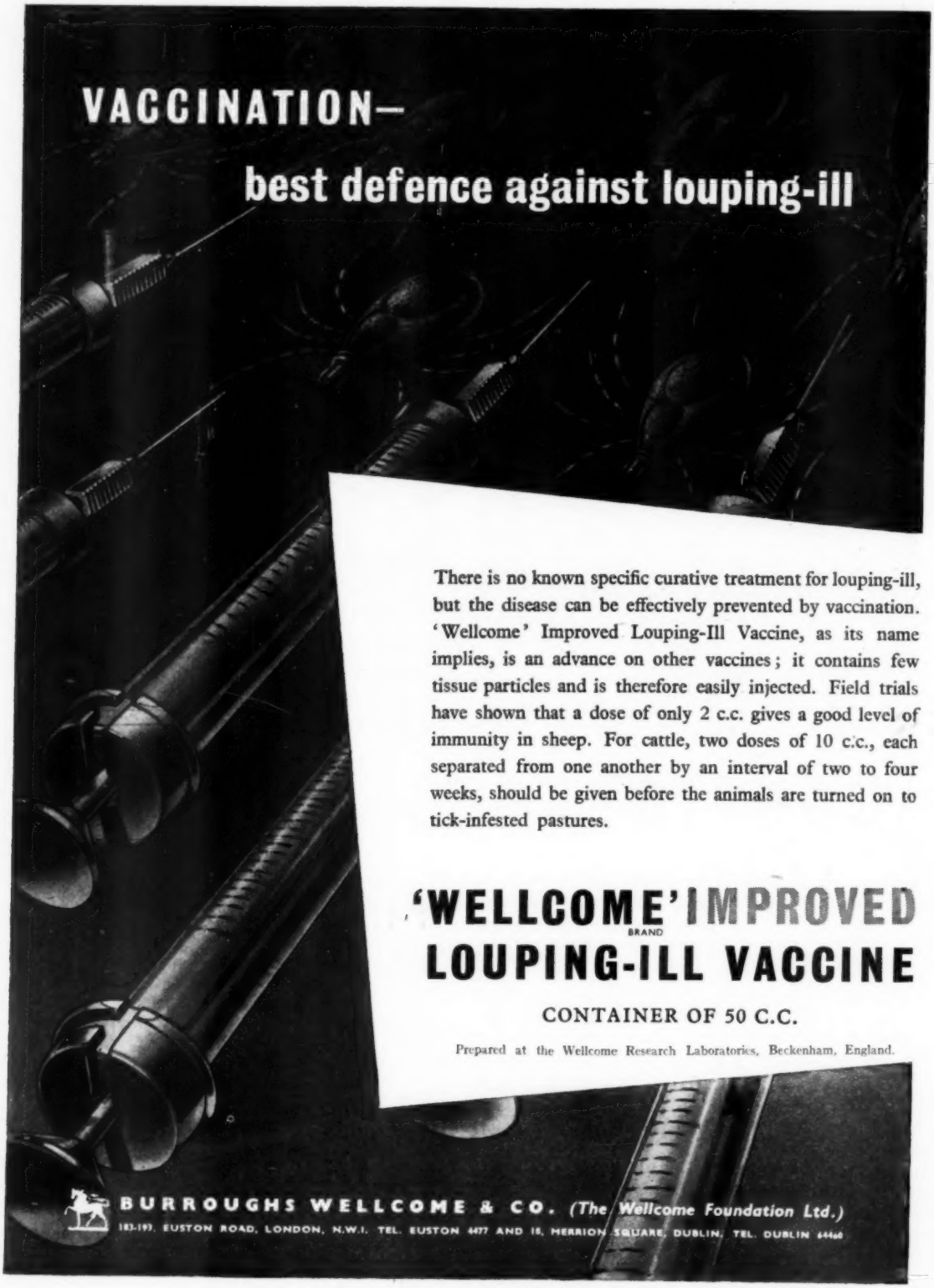
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CLINICAL COMMUNICATION

SOME EXPERIENCES WITH "MYSOLINE" IN DOGS

N. H. LAMBERT, M.R.C.V.S.,
DUBLIN

A new anticonvulsant drug, 5-phenyl-5-ethyl-hexahydro-pyrimide-4 : 6-dione which has the trade name "Mysoline," recently has been introduced in the human field for the treatment of epilepsy. It was discovered by Bogue & Carrington (1952), who showed that it was very effective in protecting laboratory animals against both electrically and chemically induced convulsions. Moreover, they demonstrated that its toxicity was low and that with it control of seizures could be obtained virtually without any hypnotic side effects. Handley & Stewart (1952) reported first trials of this new drug in man. The initial tests were carried out at the Crumpsall Hospital, Manchester, and confirmed the lack of toxicity and the high margin of safety in usage noted in experimental animals, including dogs. A full clinical trial against major epilepsy (grand mal) was then conducted at the David Lewis Epileptic Colony, Warford. This was a severe test embracing some 40 patients all of whom were continuing to have epilepsy despite other forms of treatment. The results of the trial were very satisfactory, attacks being completely stopped in 20 per cent. of cases and markedly reduced in 80 per cent. Doses of up to 1,600 mg. daily produced no serious side effects or sleepiness and most of the patients were mentally much more alert and vigorous than previously.

Because of these favourable reports and because in the hands of the writer none of the compounds at present available deals really satisfactorily with epilepsy and epileptiform conditions in dogs, it was decided to investigate the use of the new product in this species. The writer was particularly interested in the claim that "Mysoline" would give control of epileptic states without hypnotic side effects. In his experience it is often necessary to administer such doses of barbiturates and similar drugs to control fits that marked incoordination of movement, sleepiness and disorientation result. Treated animals frequently wander aimlessly round rooms or kennels, hitting themselves against furniture or walls, and sometimes becoming unmanageable. It was hoped that with "Mysoline" these distressing side effects would be avoided.

"Mysoline" was obtained in tablets of 250 mg. (¼ gramme). It is a white crystalline substance which is practically tasteless and no difficulties were encountered in its administration. It did not appear to cause any gastric or intestinal irritation in any of the animals which were treated.

So far, upwards of 100 dogs of varying ages, sizes and condition have been treated, mostly with good effect. The following case histories are appended to show the trend of the investigation.

Case Histories

Case 1. *Subject.*—Shetland sheepdog puppy, male, aged four and a half months.

This puppy had been beaten by children who had burst one of his eyeballs. Subsequently it became very nervous and had frequent bouts of hysteria terminating in convulsions. Anthelmintic treatment removed one ascarid but did not reduce the frequency of the fits. "Mysoline" therapy was commenced at a dose rate of one tablet (250 mg.) daily, but this had no apparent therapeutic effect. After a week the dose was increased to three tablets (750 mg.) daily. This rapidly controlled the fits and the dog appeared normal except that it tended to become sleepy about 10 to 15 minutes after dosing. After another week, during which no fits occurred, the dose was reduced to two tablets (500 mg.) daily, and a week later to one tablet (250 mg.). After a further week therapy was discontinued. A day later fits recommenced and "Mysoline" treatment at a level of one tablet daily was reinstituted. After a month, during which there were no fits, therapy was discontinued. The dog is now 10 months old, is in excellent condition and has had no further trouble. The top dose in this case was about 180 mg. per kg. bodyweight. A satisfactory maintenance dose appeared to be about 60 mg. per kg.

Case 2. *Subject.*—Alsatian bitch, six months old.

This dog was in good health. She had never had a fit but was extremely nervous. She had previously been treated with sedatives but these had no beneficial effect. It was decided to test the effects of "Mysoline" on her, commencing with one tablet daily and increasing after a week at each level to two, three and four tablets daily. She did not appear to derive any benefit at any dose rate. At the top dose she remained fully alert but seemed to sway a little on her hind legs. This dose was approximately 35 mg. per kg.

Case 3. *Subject.*—Wire-haired fox terrier, male, six months old.

In this case there was a history of severe and frequent epileptiform convulsions. The dog had received anthelmintic treatment and vitamin B therapy on a number of occasions without benefit. "Mysoline" therapy was commenced at a dose rate of four 250 mg. tablets daily. This controlled the fits but he appeared to stagger and show some loss of co-ordination about half an hour after the administration of each tablet. After a few days, therefore, the dose was reduced to two tablets daily (500 mg.). The side effects vanished and he remained free from fits for a month. The owner ran out of tablets during the week-end at the end of this period and the dog had a fit of moderate severity 24 hours after the last tablet had been given. Treatment was recommenced with one tablet daily. After two months on this dose, during which no fits occurred, treatment was discontinued. Thirty hours later a typical fit developed. The dog now (at 14 months old) is being maintained on one tablet every second day. It has developed well and is in excellent physical condition although of a slightly excitable disposition. The maximum dose in this case was approximately 70 mg. per kg. b.w. The effective dose was about 20 mg. per kg.

Case 4. *Subject.*—Smooth-haired fox terrier, male, eight months old.

This was a highly-strung subject of a hysterical disposition which had a number of epileptiform convulsions. Despite home treatment with worm medicine and simple sedatives, the seizures were gradually becoming more frequent and more severe. It was treated with "Mysoline," three tablets (750 mg.) daily. This very soon controlled the fits without any side effects except some slight staggering when the animal was walked about quickly. The dose was reduced to two tablets daily. The staggering disappeared and the dog appeared to be in excellent health, but after 10 days the fits recurred in severe form. As an experiment, ¼ gr. of thyroid extract was given twice daily together with one tablet of "Mysoline" daily. The

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one apparatus make it easy for one veterinarian to carry out this operation assisted by a competent surgery attendant.

Acknowledgments.—My best thanks are due to Professor Wm. C. Miller for his constant advice and for many helpful suggestions. I am indebted to Messrs. R. C. Crowhurst, J. R. Fraser, D. L. Grant, J. E. Gray, G. H. Leader and A. Shenton, veterinary surgeons, for placing affected foals at my disposal, and also to Colonel George Barnett for assistance at a number of operations. I wish especially to thank Miss K. Butcher, who assisted me at all operations in which the technique was used. It is a pleasure to record my indebtedness to Dr. C. B. V. Walker, Director, Regional Transfusion Laboratory, Cambridge, for his help in supplying the blood transfusion bottles and rubber tubing delivery sets. The special tap was manufactured to my design by Mr. F. Mitchell, Department of Pathology, University of Cambridge. Messrs. Allen & Hanbury, London, supplied the polythene catheter and the adaptor. The sketches were made by Mrs. E. L. Bain, Warrenton, Virginia.

Reference

Farrelly, B. T., Belonje, C. W. A., & Cronin, M. T. I. (1950). *Vet. Rec.* **62.** 403.

fits ceased quickly and after a few days the dose of thyroid was reduced to ½ gr. daily for a further 10 days. "Mysoline" therapy was continued for three weeks, during which time no fits occurred and the dog was apparently normal. It was killed by a motor-car a month later. The maximum dose of "Mysoline" received by this subject was about 110 mg. per kg. b.w., the satisfactory maintenance dose being 35 mg. per kg.

Case 5. *Subject.*—Golden cocker spaniel, aged six months.

This dog was under treatment for gastritis by its owner when it began to show nervous symptoms and had a number of epileptiform convulsions. It was given two tablets of "Mysoline" (500 mg.) twice daily, with good effect. There were no further fits and the dose was reduced to two tablets daily for 10 days after which the drug was discontinued. There has been no recurrence. The effective dose in this case was about 25 mg. per kg.

Case 6. *Subject.*—Large collie, aged 10 months, male.

In this case there was a history of mild para-distemper about six weeks previously and since then numerous epileptiform convulsions had occurred. When examined, the dog was in fair condition and was eating well but it showed marked inco-ordination and staggered on its hind legs. It was highly nervous and alert. The temperature was 102° F. "Mysoline" at a rate of two tablets (500 mg.) three times daily stopped the convulsions almost at once. When examined a week later the temperature was normal and the dog was much less nervous. It walked well, the staggering having almost disappeared, but it had developed a marked nasal catarrh for which it received no special treatment. The dose of "Mysoline" was reduced to two tablets twice daily for a week and then one tablet twice daily for another week when the drug was discontinued. Recovery appeared to be complete and the dog was normal in every way for two months when he was killed by a lorry. The maximum dose in this case was about 70 mg. per kg. b.w. The satisfactory maintenance dose was 35 mg. per kg.

Case 7. *Subject.*—Australian terrier, eight months old.

The history was of occasional epileptic seizures which, despite treatment, continued to occur. It had been given a number of different sedatives, had been wormed several times and had been treated with vitamin B_1, but did not respond. It was given a half tablet of "Mysoline" (125 mg.) twice daily for 12 days then once daily for 12 days with excellent effect. The fits ceased almost immediately and so far, five months later, there has been no recurrence. The dose was about 25 mg. per kg. b.w.

Case 8. *Subject.*—Smooth-haired fox terrier, aged three and a half years.

Symptoms of encephalitis comprising blindness, high-stepping gait, and characteristic holding of the head against the wall were shown in this case. "Mysoline" at a dose rate of one tablet (250 mg.) three times daily had no effect on the course of the disease. The dose rate was approximately 100 mg. per kg.

Case 9. *Subject.*—Cocker spaniel bitch, 18 months old.

When examined this bitch was just recovering from a convulsion. Her temperature was 104° F. but apart from some exhaustion she appeared normal. She had a history of fits of fairly frequent occurrence and had been treated over a period with remedies procured by the owner. "Mysoline" treatment was commenced at a level of two tablets (500 mg.) twice daily. After a day there had been no recurrence of fits and the temperature was 102° F., but as she appeared rather sleepy the dose was decreased to one tablet (250 mg.) three times daily. This was given for four days and then further reduced to one tablet daily for 14 days. Treatment was then discontinued. The bitch has since remained normal. The top dose in this case was about 70 mg. per kg. b.w., the maintenance dose being about 25 mg. per kg.

Case 10. *Subject.*—Dachshund bitch, aged eight months.

This bitch had had para-distemper and subsequently suffered violent epileptiform convulsions. "Mysoline" at a dose rate of one tablet (250 mg.) daily stopped the fits immediately. Treatment was discontinued by the owner after six days and the fits started again. Treatment was reinstituted at two tablets daily and was continued for nine days. At the end of this period the subject appeared normal and she has remained so. The maintenance dose in this case was about 30 mg. per kg. b.w.

Case 11. *Subject.*—Large mongrel terrier, six years old, male.

Although otherwise in good health this strong and very active dog suffered periodically from epileptiform convulsions, these occurring fairly regularly at intervals of one to six weeks. "Mysoline" therapy at a dose rate of one tablet (250 mg.) three times daily had an unusual effect on him, making him drowsy, stupid and careless in his habits. Even when reduced to one tablet daily this effect persisted; because of this, therapy was discontinued after a short period.

Case 12. *Subject.*—Dachshund, aged four and a half months, male.

The slightest excitement usually precipitated a convulsion in this dog. It had been treated with anthelmintics and with calcium and vitamins without effect. "Mysoline," one tablet (250 mg.) three times daily, stopped the fits at once. The dose was reduced to one tablet twice daily after a few days because of drowsiness, and shortly to one tablet daily. After treatment for another two weeks, during which no fits occurred, the drug was discontinued. No further fits occurred. The maximum dose in this case was about 150 mg. per kg. b.w., the maintenance dose being about 50 mg. per kg.

Case 13. *Subject.*—Mongrel terrier, male, four and a half years old.

This dog had a severe attack of para-distemper when six months old, later developing chorea in the temporal muscles, and becoming highly nervous and excitable, steadily getting worse as it grew older. Numerous forms of treatment had been tried to no avail. "Mysoline" therapy was instituted at half tablet twice daily, an extra half tablet being given occasionally during the first few weeks. After two months the owner reports an amazing change; the dog is now quite calm, restful at night, and has never looked so well or so happy. No doping effect was noted. A satisfactory dose in this case appears to be about 55 mg. per kg. b.w.

Discussion and Conclusions

From the experience to date certain conclusions can be reached regarding this new drug. It appears to have a high margin of safety and in the cases treated there has been, so far, no evidence of untoward side effects. The optimum therapeutic dose seems to lie between 25 and 50 mg. per kg. body weight, or approximately one ¼-gramme tablet per 10 lb. b.w. At dose rates in excess of this, some staggering and inco-ordination may be encountered. This disappears rapidly if the dose of the drug is decreased or if administration is discontinued for a short time.

"Mysoline" has been tried on several cases of chorea, in some of them in quite large doses, but apparently without beneficial effect. Excellent results, however, have been obtained in a number of cases of hysteria and convulsions subsequent to or accompanying virus infections. In para-distemper (canine encephalitis, hard-pad disease) evidence is accumulating which may show that "Mysoline" can give good control of the nervous states which are the most serious complications of this infection. A number of such cases have been treated with "Mysoline" from the time of diagnosis, often when the temperature was very high and the animal obviously acutely ill. In these the absence of nervous sequelae has been a notable feature. Further observations are in progress in this regard, and if these findings are confirmed, "Mysoline" will be a notable advance in the treatment of these difficult conditions.

Acknowledgment.—Supplies of "Mysoline" for this investigation were kindly made available by Imperial Chemical Industries, Ltd.

References

Bogue, J. Y., & Carrington, H. C. (1952). In press.
Handley, R., & Stewart, A. S. R. (1952). *Lancet*. April 12th. 742.

A provisional programme for the 13th International Dairy Congress due to open at The Hague, Holland, on June 22nd, has now been issued by the United Kingdom Dairy Association, 17, Devonshire Street, London, W.1, to whom anyone wishing to be a member of the Congress should apply forthwith. The Association has to forward applications to Holland by February 28th.

ABSTRACTS

Penicillin Resistance of *Str. agalactiae* *

The authors have studied the sensitivity of strains of *Str. agalactiae* to penicillin before and after the infusion of 25,000 units of penicillin. It is not stated how many infusions were given. Two hundred and eighty-one pre-treatment cultures were assayed by a tube dilution method, not one being found resistant to penicillin. One week after treatment 53 cultures from 19 quarters of 14 cows were assayed in the same manner. Two weeks after treatment 54 cultures of 14 quarters of 9 cows, and three weeks after treatment 67 cultures from 26 quarters of 15 cows, were similarly tested. No strains were found capable of growth in concentrations greater than a quarter of a unit per ml. It is concluded that there was no evidence of a tendency for these strains to develop resistance to penicillin during the course of treatment.

D. L. H.

* **Penicillin Resistance of** *Streptococcus agalactiae* **Isolated before and after Penicillin Therapy.** FORD, C. M., & WILSON, J. B. (1952). *Cornell Vet.* **42.** 291.

* * * * *

Immunisation of Cattle Against Heartwater*

The authors describe the method of immunisation of cattle under field conditions against heartwater in Swaziland. The strain of heartwater ("Ball 3" from the Union of South Africa) is maintained by serial passage of infected sheep blood. Sheep are bled about 14 days after being infected, the precise day of bleeding being determined by their temperature reaction. The infected blood is used for immunising cattle and maintaining the agent in sheep. For calves of less than a month old, it is sufficient to inject them intravenously with the blood: no treatment is necessary. Adults are infected intravenously and receive curative treatment as soon as they show a temperature response (usually about the 15th day). Treatment normally consists of a course of three intravenous injections of sulphamezathine (33⅓ per cent. W.V. solution) given at eight-hour intervals. Isolated cases not responding to this treatment receive uleron sodium. This method of immunisation has greatly reduced the losses from heartwater among imported grade stock.

A. W. G.

* **Heartwater Immunisation under Field Conditions in Swaziland.** FICK, J. F., & SCHUSS, J. (1952). *J. S. Afr. vet. med. Ass.* **23.** 9.

* * * * *

A Liver Biopsy Technique for Cattle*

This procedure has application in research and perhaps in clinical diagnosis.

The instrument used is a stainless steel cannula, 0·5 cm. inside diameter and 23 cm. long, with a cutting edge and pointed stilette.

The site of insertion in adult cattle is on the right side between the 10th and 11th or 11th and 12th ribs, one-quarter of the distance down from the head of the rib to the costo-chondral junction and in calves similarly, except on a level with the ends of the lumbar transverse processes.

The skin is shaved, anaesthetised and incised and the instrument with stilette in place is inserted at right angles through the intercostal muscles and then through the diaphragm. With practice these stages can be distinguished by feel. The stilette should not be withdrawn until the liver surface is reached or pneumothorax may result, with temporary distress to the animal and causing the liver to drop away from the diaphragm and be difficult to reach. The stilette is then withdrawn and the cannula pushed on through the liver lobe, cutting the capsule at both surfaces. The cutting of liver tissue gives a characteristic crepitant feeling. The finger is then placed on the opening of the cannula and this is withdrawn, bringing with it a core of liver tissue. Samples of up to 7 grammes have been obtained.

No harm has resulted even in animals repeatedly sampled, except in one case where the thoracic duct was punctured in a calf which subsequently died.

J. A. L.

* **A Liver Biopsy Technique for Cattle.** UDALL, WARNER & SMITH. (1952.) *Cornell Vet.* **42.** 25–27.

REVIEWS

[**Points of the Horse.** By Captain M. HORACE HAYES, F.R.C.V.S. (Second Edition.) 1952. Hurst & Blackett, Ltd. Price 63s.]

The new and enlarged edition of this important book is long overdue as 21 years have passed since the previous publication appeared. Those responsible for its revision are to be congratulated on bringing it up to date whilst retaining its original style. It always has been, and still remains, a standard work on matters connected with the horse. However, it does seem unfortunate that many of the original photographs have had to be retained as it is felt that many could be replaced to advantage and add clarity to the points they illustrate. The book contains 38 chapters, covering such subjects as conformation, movement, breed, and the evolution of the horse, illustrated by 666 pictures. This book may be read with both interest and profit by all associated with horses whatever their particular interest, as not only does it contain a vast store of practical knowledge but it deals also with more technical and controversial subjects, such as the mechanism of equine locomotion. Whilst this book is written primarily for the layman, it has a very definite place in the library of veterinary surgeons still associated with the horse.

* * * * *

[**Horses**. By GEORGE GAYLORD SIMPSON. Oxford University Press, Inc. 1951. Price 40s.]

The author is to be congratulated on the way he has presented the story of the horse family through 60,000,000 years of history. The book is divided into two parts. Part I deals with the horses of to-day and includes chapters on such diverse subjects as breeds, gaits, and colour. Part II deals with the lineage of the horse. The evolution of the horse is described in a fascinating manner. Details are given of the structural changes that have taken place through the ages and these are correlated with the horse's need to meet its changing environment. The numerous theories expounded are well substantiated by argument and by deductions derived from minute attention to the detailed examination of fossil remains. The methods employed by palaeontologists when examining fossils and the criteria by which they classify their findings are explained in an elementary way which makes easy reading. The book is well printed on good paper, is adequately illustrated with

pictures and charts and contains a useful appendix giving references to important works on the horse, both ancient and modern. It is written in a light vein and is commended to all who are interested in the horse.

* * * * *

Also received. **Spezielle Veterinar-Chirurgie.** By Professor Leuthold. Publisher: Ernst Reinhardt, Verlag A.G., Basle. No price given.

IN PARLIAMENT

Therapeutic Substances (Prevention of Misuse) Bill

In the House of Lords on February 12th, The Earl of Onslow, Captain, Yeomen of the Guard, moved the second reading of the Therapeutic Substances (Prevention of Misuse) Bill. He said that since the Penicillin Act of 1947 other substances had come forward not necessarily in that category, and the Bill would empower the Minister to regulate them so they would not be detrimental to the public. It would also allow the use of drugs, particularly penicillin, for feeding pigs and table poultry. If it was found that pigs fed with a tiny quantity of penicillin in their diet fattened quicker and produced more pork and bacon, it would be stupid not to do it.

In the debate which followed,

Lord Llewellin asked if a person who was allergic to penicillin ate pork from a penicillin-fattened pig, was there any possibility of its producing penicillin poisoning in that person? Conversely, if persons ate such pork and penicillin had to be given to cure a disease, would they have taken so much penicillin through the food that the penicillin given to them would have no effect?

The Earl of Onslow said that the Agricultural and Medical Research Councils had carefully investigated this matter, and had advised the Minister that penicillin applied to pigs in this form could do no harm whatever. The amount was so small that it could not in any way be passed on to consumers of pig meat. Penicillin would be available to farmers either in a compound in which the maximum would be stated, or in a mixture so diluted that it would be impossible to extract it in any way that would be harmful for mixing with home-grown feeding-stuffs. The veterinary service would be consulted on all matters of agricultural import.

The Bill was read a second time.

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QUESTIONS

Slaughterhouse, Sittingbourne

Mr. P. Wells (February 9th) asked the Minister of Food when he proposes to close the Sittingbourne slaughterhouse.

Dr. Hill: No decision has been taken to close this slaughterhouse.

Mr. Wells: Is the hon. Gentleman aware that about 6,000 animals are killed in the slaughterhouse annually, and that the meat inspectors and the slaughterers work in appalling conditions? Is he further aware that the medical officer of health, in his annual report, says this:

"These premises are obsolete, and the conditions under which meat is prepared for human food are unsatisfactory, and will continue so until a small modern slaughterhouse is provided"?

Dr. Hill: I appreciate the hon. Member's point. The new Canterbury slaughterhouse is coming into operation this week. There will now be a review of existing facilities, and the point the hon. Gentleman makes, and those made by the local authority, will be taken into account.

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Dog Licences

Sir W. Darling (February 3rd) asked the Chancellor of the Exchequer when the present dog tax of 7s. 6d. was first levied; and how many dogs there are in the United Kingdom for which licence is paid.

Mr. R. A. Butler: In 1878; and 2,927,426 licences were taken out in 1951-52.

Accidents (Dogs)

Sir W. Darling (February 9th) asked the Minister of Transport if, in view of the fact that 2,696 dogs were responsible for that number of road accidents, he will amend the Highway Code with a view to bringing dogs on the public highway under strict control.

Mr. Lennox-Boyd: The present Highway Code urges road users to keep dogs under control, but I will see if we can introduce something more effective into the revised edition which is now being prepared.

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Foot-and-Mouth Disease

Lady Tweedsmuir (February 10th) asked the Minister of Agriculture whether he has any statement to make on the outbreak of foot-and-mouth disease in North-East Scotland.

Sir T. Dugdale: This outbreak was confirmed on February 2nd at a farm between Fyvie and Tarves in Aberdeenshire. Twenty-seven cattle, 28 sheep and five pigs have been slaughtered. The origin of this outbreak is not yet known, but there appears to be no connection with recent outbreaks in England and Wales. The normal movement restrictions within an area of approximately 15 miles around the infected premises have been imposed.

Mr. Pearson (February 10th) asked the Minister of Agriculture the latest information concerning the outbreak of foot-and-mouth disease in Glamorgan; and when a previous outbreak occurred, with the losses then sustained.

Sir T. Dugdale: The disease was confirmed on February 3rd on a farm at Llantwit-Fardre and also, as a result of the movement of pigs from this farm, on a holding at Llantrisant and in a slaughterhouse at Pontypridd. The source of the original outbreak has not yet been discovered, but enquiries are continuing. Ten pigs and 23 cattle have been slaughtered. The normal movement restrictions have been imposed within a radius of approximately 15 miles from the infected premises.

The disease last occurred in Glamorgan in June and July, 1947, when there were 10 outbreaks involving the slaughter of 335 cattle, 318 sheep and 29 pigs.

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Slaughterhouses (Siting)

Mr. Grimond (February 10th) asked the Secretary of State for Scotland how far the committee which he has set up to study the siting of slaughterhouses is empowered to consider the more general questions of slaughter and marketing.

Mr. J. Stuart: The committee which I am setting up will be empowered to review generally the siting of slaughterhouses and facilities they should provide. It will not be concerned with marketing policy.

Mr. Grimond: Is the right hon. Gentleman aware that the whole question of the siting of slaughterhouses is of very great importance in Scotland and that a great deal of preliminary work will have to be done before any new scheme can be brought in? Will he give as much advance information as he can to the farmers concerned so that they have a chance to work things out in advance?

Mr. Stuart: At the moment there is no intention of altering the functions and duties of the Ministry of Food. A change in the marketing system would arise only when controls could be done away with.

Mr. Hastings: When considering his plans, will the Secretary of State give special attention to seeing that in slaughtering there is no unnecessary cruelty to the animals concerned?

Mr. Stuart: Certainly, Sir.

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Flour Improvers (Investigations)

Mr. Wade (February 11th) asked the Minister of Food to state what progress has been made in the investigations into the existing methods of treatment of flour; and whether he will give an assurance that the process of agenisation will be abandoned.

Lieut.-Colonel Hyde (February 11th) asked the Minister of Food to take steps to counteract the harmful effects produced by the use of agene in the manufacture of flour and bread.

Major Lloyd George: These complex and important investigations into possible alternatives to agene as a flour improver are requiring considerably more time than was originally thought necessary. They are being pursued with all possible speed but it would be premature to take any action until they are completed.

Mr. Wade: Does the Minister agree that on March 31st, 1952, referring to the Report of the Scientific Committee, he said: "in

view of its deleterious effect when fed in large quantities to certain animals it was felt that the use of agene should be discontinued."—[*Official Report*, March 31st, 1952; Vol. 498, c. 1162.] Is it not time that it should be discontinued?

Major Lloyd George: My first answer to a question on this matter was to the effect that my information was that it would be at least a year before the Committee investigating this matter could possibly reach a conclusion, first of all, as to whether agene was harmful, and, secondly, what possible substitute could be used in its place. Since the investigations have started, one or two possible alternatives have been presented, but it is obvious that very careful research must be undertaken before either can be accepted.

Mr. Nicholson: Can my right hon. Friend say whether it has been accepted that agene is a contributory factor to hysteria in dogs?

Major Lloyd George: That is one of the things which the Committee are investigating. I would point out, however, that agene has been used in bread in this country for over 30 years.

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Vehicle Taxation Rates

Lieut.-Colonel Bromley-Davenport (February 12th) asked the Chancellor of the Exchequer whether he is aware that, although veterinary surgeons, doctors, dentists and midwives have been exempted under the Road and Rail Traffic Act (Exemptions) Regulations, 1951, from the necessity of obtaining a carrier's licence for their utility vehicles when used for carrying medicines, drugs and instruments for use in their professional work, these vehicles are still subjected to the higher rate of Road Fund duty irrespective of ownership and use; and whether, in view of the difficulty for such persons in obtaining small lower-taxed private cars in substitution, he will take steps to ensure that the utility vehicles in question qualify for private vehicle taxation rates.

Mr. Boyd-Carpenter: Under Section 5 of the Vehicles (Excise) Act, 1949, and Section 7 of the Finance Act, 1952, vehicles constructed or adapted for the conveyance of goods must pay duty as goods vehicles if used to convey goods for hire or reward or in connection with a trade or business. I have of course no power to exempt particular classes from the general law.

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Flooding (Livestock Losses)

Mr. Bossom (February 12th) asked the Minister of Agriculture if he has yet decided whether owners of livestock killed by the flood or which will have to be slaughtered due to the flooding, will receive compensation, and upon what basis it will be determined.

Sir T. Dugdale: I am not in a position to add to what my right hon. and learned Friend the Secretary of State for the Home Department told the House yesterday. The whole question of compensation is under urgent consideration, and an announcement of the Government's intentions will be made as soon as possible.

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Antibiotics (Livestock Feeding)

Mr. Hurd (February 12th) asked the Minister of Health if he is satisfied, after taking the advice of the Medical Research Council and the Agricultural Research Council, that there will be no risk to the public if the use of penicillin and other therapeutic substances is freely allowed in the feeding of pigs and other livestock; and, particularly, whether any traces of these substances could remain in meat supplied to the public.

Miss Hornsby-Smith: My right hon. Friend is advised that there would be no risk to the public if penicillin and certain other antibiotics were included, in suitable controlled quantities, in the diet of fattening pigs and possibly table poultry. He is also advised that the quantities needed would be minute—of the order of 2-20 parts in 1,000,000—and that there would remain in the meat no traces of a kind that would entail any risk to the consumer.

ASSOCIATION OF VETERINARY STUDENTS

The following officers have been elected to the Council of the Association of Veterinary Students for the years 1953-54:—

President.—Mr. A. R. Akester, Cambridge.
Vice-President.—Mr. J. D. E. Wright, Bristol.
Secretary.—Mr. R. J. Thomas, Bristol.
Treasurer.—Mr. R. F. Johnson, Bristol.
Editor of the Journal.—Mr. B. T. Wicks, Bristol.

The address of the President is: St. Catherine's College, Cambridge. The remainder of the officers may be contacted at: The School of Veterinary Science, University of Bristol, Bristol, 8.

NOTES AND NEWS

Diary of Events

Feb. 21st.—Meeting of the Biochemical Society, in the London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1, 11 a.m.

Feb. 25th.—Meeting of the South-East Midlands Division, B.V.A., at Northampton (Franklin's Gardens Hotel), 7.30 p.m.

Feb. 26th.—Meeting of the Dumfries and Galloway Division, B.V.A., at Carlisle (Crown and Mitre Hotel), 2.15 p.m.

Feb. 26th.—Annual General Meeting of the South-Eastern Division, B.V.A., at Maidstone (The Royal Star Hotel), 2.30 p.m.

Feb. 27th.—Annual General Meeting of the Royal Counties Division, B.V.A., at Reading (Caversham Bridge Hotel), 2.30 p.m.

Feb. 27th.—91st Annual General Meeting of the Lancashire Division, B.V.A., in the Veterinary Hospital, Pembroke Gardens, Liverpool, 2.30 p.m.

Feb. 27th.—161st Annual Ball of the Royal Veterinary College Students' Union Society, to be held in the Royal Festival Hall from 8 p.m. to 3 a.m.

Feb. 27th.—Meeting of the Yorkshire Division, B.V.A., at Leeds (Hotel Metropole), 2.30 p.m.

Feb. 27th.—Annual Ball of the Veterinary Society, Faculty of Veterinary Science, The University, Liverpool, to be held in the Students' Union from 8.0 p.m. to 2.0 a.m.

March 4th.—Joint Meeting of the Midland Counties Division, B.V.A. and the Midland Medical Society, at Birmingham (Medical Institute) 8 p.m.

March 4th.—Meeting of the Association of Veterinary Teachers and Research Workers (Scottish Regional Group) in the Royal (Dick) School of Veterinary Studies, Edinburgh, 2.30 p.m.

March 5th.—Meeting of the Central Division, B.V.A., at the Royal Veterinary College, N.W.1, 6 p.m.

March 5th.—Annual General Meeting of the East Midlands Division, B.V.A., at Sutton Bonington, 2.15 p.m.

March 6th.—Meeting of the Society of Practising Veterinary Surgeons, at Oxford (The Randolph Hotel), 2.30 p.m.

March 19th.—V.V.B.F. (Northern Area): Dinner-Dance at the Northern Hotel, Aberdeen, 7.30 p.m.

March 19th.—Annual Dinner and Dance of the East Midlands Division, B.V.A., at Nottingham (The George Hotel). Reception 7 p.m.

April 1st.—The Association of Veterinary Teachers and Research Workers: Joint meeting with the Northern Region, at the University of Liverpool Veterinary Field Station, Leahurst, Windle Hill, Neston, Wirral, Cheshire. Business, 10 a.m.; Symposium on "Skin Diseases," 11 a.m.

April 25th.—30th Annual General Meeting of the Association of State Veterinary Officers, in the Auditorium of the Wellcome Foundation, 183-193, Euston Road, N.W.1, 2 p.m.

Council and Committee Meetings of the B.V.A.

The following arrangements for the Council and Committee meetings of the B.V.A. in April and July, 1953, have been made by Council B.V.A.:—

April 20th, 21st and 22nd, in Edinburgh: *Members are requested to note change of dates from those announced earlier,* viz., *April 29th, 30th and May 1st.*

July 29th, 30th and 31st in London.

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Veterinary Surgeons and the Sea-flood Disaster

REPORTS FROM THE EAST COAST

Members of the profession on the East Coast have been in the thick of things in the flood areas. In some cases they were obliged to visit their clients by water in order to reach stock which had been rescued from flooded pastures. Mr. Oliver, Hon. Secretary of the Lincolnshire Division, has described in a letter how cattle lorry drivers (who he said have done splendid work) were often guided to the farms and buildings by veterinary surgeons going before them in "ducks."

Some cases of mastitis, due to cows not being milked for

several days, have been treated, as have other cattle which had drunk freely of salt water from contaminated troughs. Pigs, on the other hand, though in some cases standing in salt water for up to four days at a time, appear to be little the worse. By the time these words are in print the local veterinary surgeons will have seen whether complications are likely to set in due to exposure borne by the animals.

Mr. G. F. Smith, Hon. Secretary of the Eastern Counties Division, mentions the very large numbers of domestic animals treated by veterinary surgeons, and he refers also to the collaboration between members of the profession and certain animal welfare societies. From reports of their activities it is clear that the welfare societies did some very valuable and humane rescue work, upon which they are to be congratulated.

The profession, of course, made contact with the local branches of the National Farmers' Union in order to give all possible help to the farming community, and invited suggestions for any additional help that could be offered in the emergency. Veterinary surgeons are not accustomed to advertise the services they render, and in letters received from the areas the only expressions used are that they " worked hard " and " coped." There can be no doubt, however, that they took a very full and important share in all that was done, and the Association decided to address a letter to the Press referring to the profession's contribution. In this connection, public appreciation of the response made by veterinary surgeons to this emergency call upon their voluntary services is typified by a letter received at this office from a Carlisle lady. In its course she writes: " I read in last night's (February 9th) *Cumberland News* the letter regarding the splendid work the veterinary surgeons have done during the floods. Their profession is one for which I have the most profound respect and affection and if I can do anything to draw attention to their brave, unselfish work, I will do all I can."

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Farmers' " Gratitude to Veterinary Surgeons "

Members of the profession everywhere will appreciate the following expression of thanks from the farming community, voiced on behalf of the latter, in *The Times* of Monday last, by Mr. C. H. Moseley, Chairman of the National Farmers' Union and Wool Committee. Writing from 45, Bedford Square, W.C.1, Mr. Moseley says: " Farmers will be ready to acknowledge a debt of gratitude to veterinary surgeons, who have done a truly magnificent job in the areas hit by the flood disaster. While reference to their work is forbidden by the canons of their profession, may I, Sir, through your columns, pay a tribute of thanks on behalf of the farmers who have enjoyed their assistance."

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Heavy Snowfalls Cause Sheep Losses

Sheep farmers on the fells in the North of England also had their troubles last week, through heavy and continuous snowstorms. Hundreds of sheep which had been buried for five days by deep snow drifts on the Derbyshire moors were rescued on Sunday by shepherds and farmers, helped by over 200 ramblers from the Sheffield, Barnsley and Doncaster areas. A base was established on Stoney Ridge, near the Fox House Inn on the Longshaw Moors, and there ramblers drew from a supply of hay which they packed into sacks and carried to the sheep on the moors. Although one farmer was known to have lost 70 sheep out of his original flock of 160, the total losses of animals in north Derbyshire were not expected to be revealed for about a week. At that time over 1,000 hill breeding ewes were known to be buried under deep drifts on the moorlands of Wensleydale and Coverdale, North Yorkshire.

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Material from Slaughterhouses for Veterinary Research Purposes

Following upon representations made by the B.V.A. to the Ministry of Food, an instruction has now been issued that facilities should be given to veterinary surgeons and research organisations to remove from slaughterhouses small portions of carcases or organs where required specifically for research. The Ministry's slaughterhouse managers have been informed that they may surrender such material on receipt of a signed statement by the veterinary surgeon or by a responsible officer of a research organisation giving a description, and the weight of the material, and the reason why it is required.

PERSONAL

Births.—Loosmore.—On February 13th, 1953, at Liverpool, to Anne-Marie, wife of Richard M. Loosmore, B.V.Sc., M.R.C.V.S., a son—Guy.

Pybus.—On February 5th, 1953, to Diana, wife of John Pybus, M.R.C.V.S., 345, London Road, St. Leonards-on-Sea, Sussex, a son—Robert William, brother for Philip.

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Mayor of Beverley.—The Yorkshire Post announces that Beverley's Coronation Mayor will be Councillor Dennis Dunn, a veterinary surgeon, of North Bar Within, and a member of the Borough Council for the past three years. The Mayoress will be his wife, Mrs. Mary Dunn.

Councillor Dunn will be installed on May 17th. He is aged 54 and spent most of his life in Cottingham, although he has lived in Beverley since 1938. He represents the British Veterinary Association on the County Agricultural Executive Milk Sub-Committee.

Although a Conservative, Mr. Dunn is opposed to the introduction of party politics into the council chamber. " I am against political issues masking town affairs," he told *The Yorkshire Post*, and he added that he felt there was a danger of that happening at Beverley.

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DEATH OF DR. ERWIN F. SCHROEDER

We regret to learn, from the current issue of *Veterinary Medicine*, of the death of Dr. Erwin F. Schroeder, former chief veterinarian of the Angell Memorial Animal Hospital.

Through the medium of his many contributions to the literature on fracture treatment Dr. Schroeder became known to countless veterinarians. He is perhaps best known for his modification of the Thomas splint, called the " Schroeder " splint by resolution of the Massachusetts Veterinary Association. "As the inventor of many mechanical gadgets used in fracture repair," says the memoir, "Dr. Schroeder persistently minimised the importance of the gadget and stressed the necessity of increased knowledge of anatomical, functional and physical factors involved in fracture reduction and fixation.

"At lectures and demonstrations before orthopaedic surgeons, as well as before numerous veterinary groups, he gathered hosts of friends and admirers in both the medical and veterinary professions."

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PARLIAMENTARY AND SCIENTIFIC COMMITTEE

At the annual meeting of the Parliamentary and Scientific Committee held at the Savoy Hotel on Wednesday, February 11th, Dr. W. R. Wooldridge was elected a Vice-President. The annual luncheon, on the same day, was attended also by the President (Mr. A. M. Graham) and Junior Vice-President (Mr. Alex Thomson) of the British Veterinary Association, when the Duke of Edinburgh spoke of problems posed in the industrial application of scientific discoveries.

Lord Samuel, the Immediate Past-President of the Committee, apologised for the absence of the newly elected President, Lord Waverley, who is in Canada. He said that Lord Waverley was the man more responsible than any other for the increase in the State grant to universities from £2,000,000 to more than £20,000,000 in the past 10 years. That great sum was national investment of the most profitable kind; it was an investment in brains, and such investment yielded the longest return.

He explained that the Parliamentary and Scientific Committee, founded by the members of the House of Commons shortly before the second world war, now included in its membership more than a quarter of those elected to that House, a smaller but active contingent from the House of Lords, and representatives of more than 70 institutions connected with the applied sciences.

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AGRICULTURAL RESEARCH COUNCIL VETERINARY CLINICAL FELLOWSHIPS

This year the Agricultural Research Council (Cunard Building, 15, Regent Street, London, S.W.1) are offering for the first time two veterinary clinical fellowships to provide opportunities for suitably qualified veterinary clinicians and pathologists of Ph.D. standing to continue research for two or three years. The fellowships will be awarded for one year in the first instance and will be renewable annually up to a maximum of three years; they will carry a stipend of £850 a year.

The Council are continuing to offer post-graduate research studentships and training grants to holders of veterinary qualifications, and also a small number of veterinary training grants to enable honours graduates in one of the basic sciences to read for a veterinary qualification after taking their science degree. Applications for these awards should reach the Council by March 20th.

Further details of the awards offered by the Council, together with information about openings in agricultural research and advisory work, are contained in a pamphlet entitled "Careers in Agricultural Research—Training Grants, Studentships and Fellowships awarded by the Agricultural Research Council, 1953" obtainable on application to the Secretary, Agricultural Research Council, Cunard Building, 15, Regent Street, London, S.W.1.

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TUBERCULOSIS (ATTESTED HERDS) SCHEME, 1950

STATEMENT SHOWING POSITION IN EACH COUNTY ON DECEMBER 31ST, 1952

The figures shown in column 1 of the statement reproduced below show the number of cattle on June 4th, 1952. The figure for Great Britain is about 200,000 less than that for June 4th, 1951, which was used in the last four quarterly statements.

At the end of 1952 there were 3,730 Supervised Herds containing 135,000 cattle. These herds needed only one clear tuberculin test in order to qualify as Attested Herds.

There are three Tuberculosis Attested Areas—the Isles of Scilly, part of the county of Bute, and the county of Zetland.

There are two Tuberculosis Eradication Areas comprising—

(a) the counties of Cardigan and Carmarthen (except a small part), and part of Pembroke; and

(b) the counties of Ayr, Dumfries, Kirkcudbright, Renfrew and Wigtown, and part of Argyll and Bute.

Compulsory tuberculin tests, and the slaughter of reactors, are proceeding in these two areas with a view to their declaration as Attested Areas. In Area (a) about 300 herds (4,650 cattle), and in Area (b) 29 herds (1,420 cattle) are being dealt with compulsorily.

The figures in column 3 represent the number of cattle in Attested Herds at the last herd test and are, therefore, only approximate. They do not include cattle in Supervised Herds or in herds in Eradication Areas which are being dealt with compulsorily.

County	Total Cattle as at 4.6.52	Number of Attested Herds as at 31.12.52	Number of Cattle in Attested Herds as at 31.12.52	Percentage of Attested Cattle to Total Cattle
Bedford	46,639	221	13,340	28·6
Berkshire	90,473	849	53,070	58·7
Buckingham	115,448	729	40,480	35·0
Cambridge	32,540	184	10,970	33·7
Isle of Ely	22,187	39	2,010	9·1
Chester	242,319	1,510	71,250	29·4
Cornwall	268,120	1,934	64,740	24·1
Isles of Scilly	516	88	516	100·0
Cumberland	227,896	3,306	148,740	65·3
Derby	183,577	815	38,560	21·0
Devon	404,895	3,316	123,280	30·4
Dorset	159,494	1,393	79,360	49·8
Durham	116,500	1,157	39,760	34·1
Essex	126,467	1,021	56,450	44·6
Gloucester	195,604	1,397	74,410	38·0
Hampshire	156,605	1,474	80,900	51·7
Isle of Wight	22,072	290	11,190	50·7
Hereford	133,654	1,103	43,600	32·6
Hertford	62,242	501	30,030	48·2
Huntingdon	30,150	78	5,230	17·3
Kent	122,872	920	44,690	36·4
Lancaster	272,237	2,262	86,150	31·6
Leicester	168,250	592	32,110	19·1
Lincoln (Holland)	29,413	26	1,190	4·0
Lincoln (Kesteven)	73,428	213	10,930	14·9
Lincoln (Lindsey)	169,545	368	18,570	10·9
London	—	—	—	—
Middlesex	8,085	55	2,860	35·4
Norfolk	202,389	905	63,920	31·6
Northampton	149,615	392	25,870	16·5
Soke of Peterborough	6,981			
Northumberland	201,442	706	40,090	19·9
Nottingham	114,555	393	19,550	17·1
Oxford	109,773	840	48,780	44·4
Rutland	20,386	30	1,260	6·2
Salop	276,262	1,510	78,990	28·6
Somerset	321,916	2,816	135,590	42·1
Stafford	232,043	877	41,060	17·7
Suffolk, East	82,634	664	31,930	38·6
Suffolk, West	40,377	289	17,910	44·4
Surrey	54,539	664	29,030	53·2
Sussex, East	107,502	878	40,030	37·2
Sussex, West	79,565	694	39,400	49·5
Warwick	149,494	718	39,230	26·2
Westmorland	96,136	1,970	79,670	82·9
Wiltshire	209,293	1,260	94,960	45·4
Worcester	98,843	507	25,190	25·5
York, E. Riding	138,832	249	11,820	8·5
York, N. Riding	252,285	2,005	69,680	27·6
York, W. Riding	342,966	2,670	96,490	28·1
ENGLAND	6,760,056	46,878	2,214,836	32·7
Anglesey	54,120	786	17,830	32·9
Brecon	46,455	1,094	28,120	60·5
Caernarvon	58,768	1,671	32,200	54·8
Cardigan	79,710	4,358	76,860	96·4
Carmarthen	139,567	6,455	123,810	88·7
Denbigh	101,736	1,653	46,340	45·5
Flint	60,914	400	15,800	25·9
Glamorgan	73,453	1,110	24,390	33·2
Merioneth	40,083	1,651	32,620	81·4
Monmouth	67,978	551	20,320	30·0
Montgomery	96,249	2,592	63,070	65·5
Pembroke	103,298	3,358	77,210	74·7
Radnor	36,096	590	14,510	40·2
WALES	958,427	26,269	573,080	59·8
ENGLAND & WALES	7,727,483	73,147	2,787,916	36·1
Aberdeen	216,248	666	43,510	20·1
Angus	65,432	246	21,810	33·8
Argyll	60,597	1,653	42,930	70·8
Ayr	155,152	2,355	145,380	93·7
Banff	53,682	190	10,660	19·9
Berwick	35,317	187	11,950	33·8
Bute	11,398	354	11,398	100·0
Caithness	26,691	264	6,820	25·5
Clackmannan	4,384	44	3,090	70·5
Dumfries	105,140	1,961	96,720	92·0
Dunbarton	17,755	327	15,330	86·3
East Lothian	17,168	95	6,340	36·9
Fife	64,932	612	40,150	61·8
Inverness	50,370	1,631	21,480	42·6
Kincardine	39,388	118	8,970	22·8
Kinross	9,294	79	5,310	57·1
Kirkcudbright	76,130	1,129	70,850	93·1
Lanark	94,305	1,613	82,660	87·7
Midlothian	24,161	314	15,040	62·2
Moray	29,128	156	10,420	35·8
Nairn	8,783	72	3,220	36·7
Orkney	48,379	635	14,650	30·3
Peebles	11,488	279	10,410	90·6
Perth	89,524	650	33,110	37·0
Renfrew	30,651	553	28,980	94·5
Ross-shire	38,623	2,334	14,180	36·7
Roxburgh	36,744	265	12,360	33·6
Selkirk	6,249	123	3,460	55·4
Stirling	41,048	677	28,540	69·5
Sutherland	9,068	789	5,930	65·4
West Lothian	16,037	228	10,740	66·9
Wigtown	75,363	897	71,660	95·1
Zetland	7,021	1,806	7,021	100·0
SCOTLAND	1,575,650	28,282	915,079	58·1
GREAT BRITAIN	9,303,133	96,429	3,702,995	39·8

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SHEEP SCAB: "RETAIN DOUBLE DIPPING"

SUCCESSFUL END OF 155-YEAR FIGHT IN SIGHT

In its issue of February 10th, the *Farmer & Stock-breeder* reports that, at a recent meeting, Herefordshire Diseases of Animals Committee were told by the divisional veterinary officer, Dr. A. J. Wilsdon, that the end of a 155-year fight against sheep scab in this country was in sight. In 1896 there were 3,536 outbreaks of the disease in the country, and this total had gradually declined over the years until in 1951 there were 16 outbreaks, 15 of which had been traced back to the Black Mountains area. In 1952 there had been only one outbreak in the whole country.

"Addressing his remarks to the members of a deputation from the Herefordshire branch of the National Farmers' Union, who had asked for certain amendments to the double dipping regulations in the Black Mountains area, Dr. Wilsdon said that with the end of sheep scab in sight, they should do nothing to interfere with the promise of success. He reminded the deputation that the double dipping regulations had only another two years to run, provided that there were no further outbreaks of sheep scab."

The committee declined to make any alterations to the regulations as they applied to the Black Mountains, but urged farmers to make full use of their right of appeal to the committee in cases of hardship.

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FOOT-AND-MOUTH DISEASE

On Monday last the Ministry of Agriculture announced that there was an outbreak of foot-and-mouth disease at Chilton Polden, Bridgwater, Somerset, on the previous Saturday, involving 55 cattle and 54 pigs. Outbreaks at Caerau, near Maestag, and Llangan, Bridgend, Glamorgan, during the week-end involved nearly 30 pigs.

British Turkey Federation Conference at Bournemouth

Fifteen months ago the British Turkey Federation came into being. This virile and energetic Federation has now become probably the most active of all the poultry associations in this country, and has just held its second conference at Bournemouth from February 9th to 12th. The Chairman of the Federation is Mr. R. Chalmers Watson whose father, Dr. Chalmers Watson, was well known to "Dick" students in the 1920's and 1930's as the owner of an outstanding dairy farm in East Lothian.

Mr. Chalmers Watson opened the Conference on the afternoon of the 9th, and this was followed in the evening by a civic reception. The scientific part of the proceedings commenced on Tuesday by Dr. Duckworth, of the Rowett Research Institute, who gave a paper on "Feeding Problems in an Expanding Turkey Industry." The author in an interesting preamble discussed the present world situation of an increasing human population with less available food. He described some of the nutritional requirements of turkeys and his contribution promoted a lengthy discussion. In the afternoon session, under the Chairmanship of Mr. R. Paisley, of Messrs. May & Baker, Miss Wright, of the Harper Adams Agricultural College, described "New Developments in the Turkey Industry in the U.S.A." following upon her recent visit to that country.

Dr. W. M. McKay gave a paper on "Recent Developments in the Turkey Industry" in which he described the paucity of research work in turkey nutrition in this country and spoke on, amongst other things, the value of antibiotics in supplementing the food of turkeys to obtain maximum growth rate. Dr. R. F. Gordon, of the Animal Health Trust, presented a paper on "Keeping Turkeys Healthy," followed by two interesting films on "Turkeys" and "Chemical Caponizing" with a commentary by Dr. Blount, at a meeting under the Chairmanship of Dr. W. M. McKay. Dr. Gordon described the common turkey diseases with a brief description of their symptoms and treatment.

The panel of a general quiz included Mr. J. E. Wilson, M.R.C.V.S., of Lasswade, Dr. R. Coles, Chief Poultry Officer of the Ministry of Agriculture and Fisheries, and well-known turkey breeders, such as Mr. A. S. Dixon, of Perthshire, Mr. J. R. Studley and others.

On Wednesday, Mr. R. Feltwell, of the National Agricultural Advisory Service, spoke upon "Producing 10- to 16-week-old turkeys" and the afternoon was given over to discussion and demonstrations.

The banquet was held in the evening, the guest of honour being Lord Ranfurly, a well-known farmer in Buckinghamshire. Others present were Dr. Temperton, Director of the poultry centre of the Harper Adams Agricultural College, Dr. Cuthbertson, of Glaxo Laboratories, and Miss Eunice Kidd, President of the Chick Producers' Association.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

FOOT-AND-MOUTH DISEASE:

Glam.—Rear of Evans Terrace, Caeran, Maesteg (Feb. 13th); Rear of Hartshorn Terrace, and Toncwd Farm, Caeran, Maesteg (Feb. 14th); 23, Magazine Street, Caeran, Maesteg; Newlands Fach, Llangan, Bridgend (Feb. 15th).

Somerset.—Goose Lane Farm, Chilton, Polden, Bridgwater (Feb. 14th).

ANTHRAX:

Derbys.—Scarcliffe Grange Farm, Scarcliffe, Chesterfield (Feb. 14th).

Glos.—Tan House Farm, Frampton-on-Severn, Gloucester (Feb. 13th).

Sussex.—New Lodge Farm, Coleman's Hatch, Hartfield, Tunbridge Wells (Feb. 10th).

FOWL PEST:

Lancs.—Simpson Clough Piggery, Heywood (Feb. 15th).

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THE HARRY STEELE-BODGER MEMORIAL FUND

All donations to this Fund should be sent to:—

S. L. Hignett,
Steele-Bodger Memorial Fund,
B.V.A.,
36, Gordon Square,
London, W.C.1.

Cheques, postal orders, etc., should be made payable to "Steele-Bodger Memorial Fund."

FOOT-AND-MOUTH DISEASE: REASONS FOR THE SLAUGHTER POLICY

Following upon the recent outbreak of foot-and-mouth disease in Scotland, Mr. D. S. Barbour, M.R.C.V.S., of the Animal Health Section, Edinburgh, of the Ministry of Agriculture, addressing the Torwood and District Agricultural Discussion Society, said that animals suffering from foot-and-mouth disease were not slaughtered because they could not be cured but in order to prevent the manufacture of virus and so limit the spread of the infection.

Mr. Barbour admitted quite frankly that the cure was not difficult, but required careful nursing. The real trouble was that the whole time the animal was being cured it was manufacturing virus and this virus was capable of being spread. It was true, he said, that they had produced vaccines against each individual type of virus and against variants of these types, but in order to protect themselves in a satisfactory manner by use of vaccines they would have to vaccinate with every type of variant. This, of course, in this country would be utterly impossible when they remembered that cattle, sheep, goats and pigs and deer would all require to be vaccinated.

The vaccine did not confer an immunity for a period of from 4 to 14 days or, indeed in some cases, 21 days from the date of inoculation, and they must remember that local spread nearly always took place within this period. In point of fact, local spread would, in most cases, have started before the stock-owner of the infected place had seen symptoms which would make him suspicious that the stock had the disease.

Mr. Barbour concluded by saying that a policy of vaccination in this country was liable to end with the disease becoming endemic because among the vaccinated stock there was always the risk of having animals which were showing no symptoms of disease but were carriers capable of spreading infection to other animals.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

THE N.V.B. AND MUTUAL DEFENCE SOCIETY

Sir,—It is customary, when we have escaped from a major disaster, to give public thanks. On a lesser scale, having escaped recently from a trying experience, I should like to place on record my extreme sense of gratitude to the National Veterinary Benevolent and Mutual Defence Society for having taken over my worry and brought matters to a successful conclusion. To particularise: a solution prepared locally for a locum of mine, for intravenous injection, proved immediately fatal to six out of nine cattle, the remainder becoming seriously ill; this naturally resulted in a major claim against myself as principal, although I personally had nothing to do with the matter.

The point I should like to stress is that *none* of us can guard against this sort of happening—it may occur through remote negligence, or, as in my case, through a long chain of circumstances entirely outside our control; or some mistaken client may bring an entirely frivolous claim. But whatever the cause, membership of the National Veterinary Benevolent and Mutual Defence Society provides one with a background of freedom from worry. And yet there are *still* many practising veterinary surgeons who do not belong to the Society! . . . *Verb. sap.*—Yours faithfully, PAUL CROSFIELD. Chipping Norton, Oxon. *February 15th*, 1953.

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A REVIEW

Sir,—In what way can the profession benefit from the publication of nonsensical statements contained in a book, and in a letter written in support of them?

Whither will we be led if we are guided by such works as:

"Medicine"—by a Patient.
"Law"—by a Client.
"Theology"—by a Layman.
"Veterinary Science"—by an Unqualified Critic?—Yours faithfully, THOMAS LISHMAN, 23, Queen's Gate Gardens, Kensington, London, S.W.7. *February 6th*, 1953.